

Name: _____
A2&T-Review for Quarter 2 Exam 3

1) The roots of $24x^3 = 10x^2 + 4x$ are

A) $\frac{1}{4}, -\frac{2}{3}$

B) $-\frac{1}{4}, \frac{2}{3}$

C) $\frac{1}{4}, 0, -\frac{2}{3}$

D) $-\frac{1}{4}, 0, \frac{2}{3}$

Questions 2 through 4 refer to the following:

Solve the given polynomial equation by factoring and/or using the quadratic formula. [Express all roots in simplest form.]

2) $x^5 - 10x^3 + 21x = 0$

3) $24x^3 = 10x^2 + 4x$

4) $2x^3 = 3x - 5x^2$

5) What is the solution set for the following system of equations?

$$y = x^2 + 3$$

$$3x - y + 1 = 0$$

A) $\{(2, -7), (1, -4)\}$

C) $\{(2, 7), (-1, 4)\}$

B) $\{(2, 7), (1, 4)\}$

D) $\{(2, -7), (-1, -4)\}$

6) Determine the solution to the following system of equations:

$$y = x^2 - 6x + 6$$

$$y - x = -4$$

multiply by 2

7) In a given rectangle, the length varies inversely as the width. If the length is doubled, the width will

A) be divided by 2

C) be multiplied by 2

B) remain the same

D) increase by 2

8) If x varies inversely as y , and $x = 12$ when $y = 3$, what is the value of x when $y = 9$?

A) 36

B) $\frac{1}{4}$

C) $\frac{1}{3}$

D) 4

9) If y varies directly as x , and $x = 4$ when $y = 9$, what is x when $y = 144$?

A) 64

B) 36

C) 32

D) 324

8) $xy = xy$

$$12(3) = x(9)$$

$$\frac{36}{9} = \frac{9x}{9}$$

$$4 = x$$

9) $\frac{x}{y} = \frac{x}{y}$

~~$$\frac{4}{9} = \frac{x}{144}$$~~

$$\frac{576}{9} = \frac{9x}{9}$$

$$X = 64$$

$$\begin{aligned}
 1) \quad & 24x^3 = 10x^2 + 4x \\
 & \underline{-10x^2 - 4x \quad -10x^2 - 4x} \\
 & 24x^3 - 10x^2 - 4x = 0 \\
 & 2x(12x^2 - 5x - 2) = 0 \\
 & 2x(12x^2 - 8x + 3x - 2) = 0 \\
 & 2x(4x(3x-2) + 1(3x-2)) = 0 \\
 & 2x(3x-2)(4x+1) = 0 \\
 & \begin{array}{l|l|l} 2x=0 & 3x-2=0 & 4x+1=0 \\ x=0 & 3x=2 & 4x=-1 \\ & x=\frac{2}{3} & x=-\frac{1}{4} \end{array} \quad (D)
 \end{aligned}$$

$12(-2) = -24$
 $\begin{array}{r} -8 \overline{) 3} \end{array}$

$$\begin{aligned}
 2) \quad & x^5 - 10x^3 + 21x = 0 \\
 & x(x^4 - 10x^2 + 21) = 0 \quad \text{Let } y = x^2 \\
 & x(y^2 - 10y + 21) = 0 \quad x^4 = (x^2)^2 \\
 & x(y-7)(y-3) = 0 \\
 & x(x^2-7)(x^2-3) = 0 \\
 & \begin{array}{l|l|l} x=0 & x^2-7=0 & x^2-3=0 \\ & x^2=7 & x^2=3 \\ & x=\pm\sqrt{7} & x=\pm\sqrt{3} \end{array}
 \end{aligned}$$

$x=0, \pm\sqrt{7}, \pm\sqrt{3}$

3) Same as #1.

$$\begin{aligned}
 4) \quad & 2x^3 = 3x - 5x^2 \\
 & \underline{-3x + 5x^2 \quad -3x + 5x^2} \\
 & 2x^3 + 5x^2 - 3x = 0 \\
 & x(2x^2 + 5x - 3) = 0
 \end{aligned}$$

Quadratic Formula $a=2, b=5, c=-3$

$$\begin{aligned}
 x &= \frac{-5 \pm \sqrt{5^2 - 4(2)(-3)}}{2(2)} \\
 x &= \frac{-5 \pm \sqrt{49}}{4} \\
 x &= \frac{-5 \pm 7}{4} \\
 x &= 0 \quad \text{or} \quad x = \frac{-5+7}{4} = \frac{2}{4} = \frac{1}{2} \quad \text{or} \quad x = \frac{-5-7}{4} = \frac{-12}{4} = -3
 \end{aligned}$$

5)

$$y = x^2 + 3$$

$$3x - y + 1 = 0$$

$$\begin{array}{r} +y \quad +y \\ \hline 3x + 1 = y \end{array}$$

$$\begin{array}{r} 3x + 1 = x^2 + 3 \\ -3x - 1 \quad -1 - 3x \\ \hline \end{array}$$

$$0 = x^2 - 3x + 2$$

$$= (x - 2)(x - 1)$$

$$x = 2 \quad x = 1$$

$$y = 2^2 + 3$$

$$y = 4 + 3$$

$$y = 7$$

$$(2, 7)$$

$$y = 1^2 + 3$$

$$y = 1 + 3$$

$$y = 4$$

$$(1, 4)$$

6)

$$y = x^2 - 6x + 6$$

$$y - x = -4$$

$$\begin{array}{r} +x \quad +x \\ \hline y = x - 4 \end{array}$$

$$\begin{array}{r} x^2 - 6x + 6 = x - 4 \\ -x + 4 \quad -x + 4 \\ \hline \end{array}$$

$$x^2 - 7x + 10 = 0$$

$$(x - 5)(x - 2) = 0$$

$$x = 5 \quad x = 2$$

$$y = 5^2 - 6(5) + 6$$

$$y = 25 - 30 + 6$$

$$y = 1$$

$$(5, 1)$$

$$y = 2^2 - 6(2) + 6$$

$$y = 4 - 12 + 6$$

$$y = -2$$

$$(2, -2)$$

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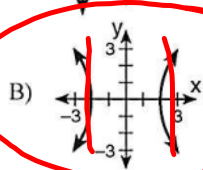
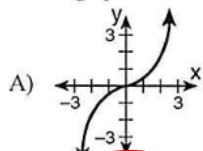
- 10) The cost of pens varies directly as the number of dozens purchased. If 4 dozen cost \$10.60, how much will 7 dozen cost?

A) \$18.45 B) \$18.75 C) \$18.55 D) \$18.65

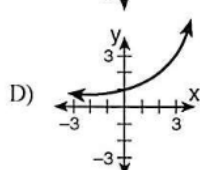
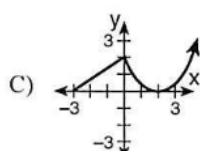
- 11) Which set of ordered pairs does not represent a function?

A) $(3,-2), (3,-4), (4,-1), (4,-3)$ C) $\{(3,-2), (4,-3), (5,-4), (6,-5)\}$
 B) $\{(3,-2), (5,-2), (4,-2), (-1,-2)\}$ D) $\{(3,-2), (-2,3), (4,-1), (-1,4)\}$

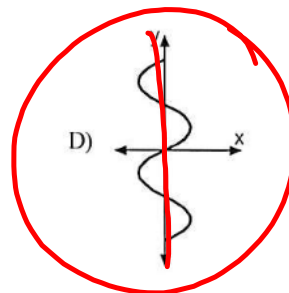
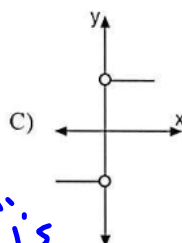
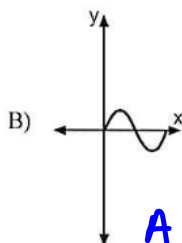
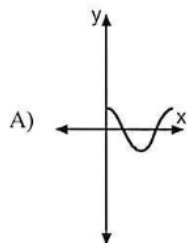
- 12) Which graph does not represent a function?



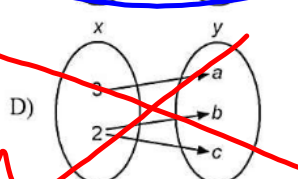
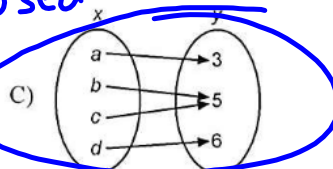
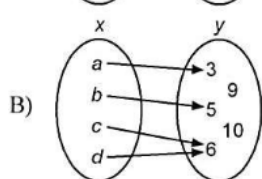
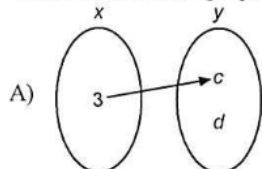
Not pass
Vertical
line test



- 13) Which graph of a relation is not a function?



- 14) Which of the following represents an onto function?



All "y" is
used

Needs
to be
a function

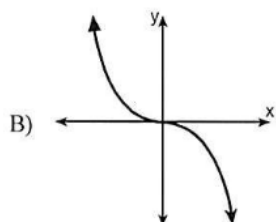
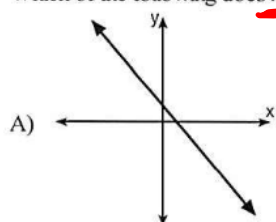
10) cost
pencils

$$\frac{10.60}{4} = \frac{x}{7}$$

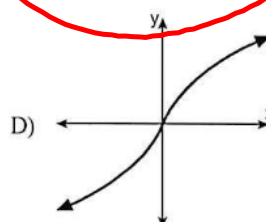
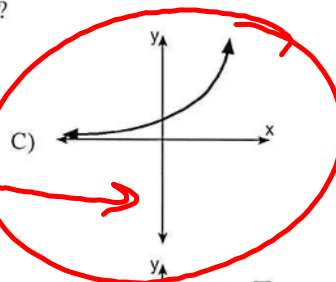
$$\frac{74.20}{4} = \frac{4x}{4}$$

$$x = 18.55$$

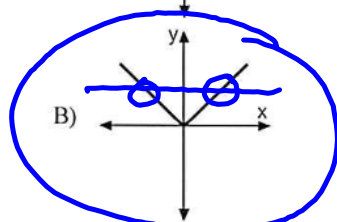
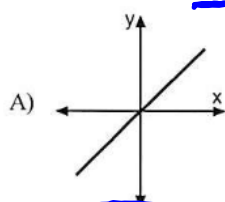
- 15) Which of the following does not represent an onto function?



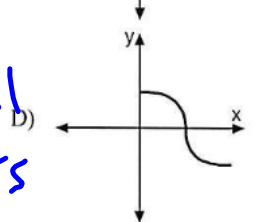
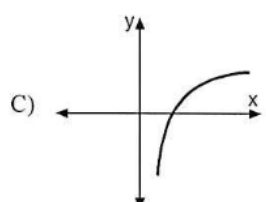
NOT
using



- 16) Which diagram does not represent a one-to-one function?



Vertical
AND
Horizontal
line tests



- 17) The function $f(x) = x^2 - 2x$ is

- A) onto but not one-to-one
B) both one-to-one and onto

← Parabola

- C) neither one-to-one nor onto
D) one-to-one but not onto

- 18) The function $f(x) = \sqrt{x - 4}$ is real for what values of x ?

A) $\{x \mid x > 0\}$

B) $\{x \mid x < 0\}$

C) $\{x \mid x \leq 4\}$

D) $\{x \mid x \geq 4\}$

- 19) The domain of the real-valued function $f(x) = \frac{1}{\sqrt{x - 3}}$ contains which of the following numbers?

A) -1

B) 2

C) 3

D) 7

- 20) If $f(x) = \frac{2x^2}{x^2 - 9}$ what is the domain of $f(x)$?

A) all real numbers except 3 and -3

B) all real numbers except 3

C) all real numbers

D) all real numbers except 0

$$x^2 - 9 \neq 0$$

$$(x-3)(x+3) \neq 0$$

$$x \neq 3 \quad x \neq -3$$

18) $f(x) = \sqrt{x-4}$ Domain

$$\begin{array}{r} x-4 \geq 0 \\ +4 \quad +4 \\ \hline x \geq 4 \end{array} \quad \textcircled{D}$$

19) $f(x) = \frac{1}{\sqrt{x-3}}$

↑
Can't be 0
or negative

$$\begin{array}{r} x-3 > 0 \\ +3 \quad +3 \\ \hline x > 3 \end{array} \quad \textcircled{D}$$

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- 21) The accompanying graph shows the heart rate, in beats per minute, of a jogger during a 4-minute interval.



What is the range of the jogger's heart rate during this interval?

A) 0-110

B) 60-110

C) 0-4

D) 1-4

- 22) For the graph of the relation below:

(a) State the domain.

— x-values

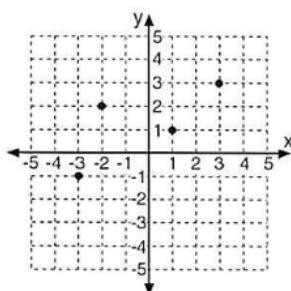
(b) State the range.

— y-values

(c) State whether or not the relation is a function. [Justify your answer.]

a) $\{-3, -2, 1, 3\}$

b) $\{-1, 1, 2, 3\}$



c) yes, b/c every x has only 1 y

23) For the graph of the relation below:

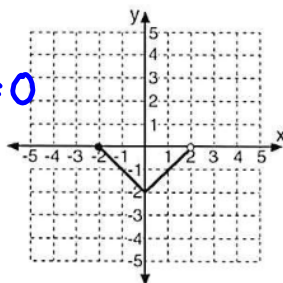
(a) State the domain.

$$[-2, 2) \text{ or } -2 \leq x < 2$$

(b) State the range.

$$b) [-2, 0] \text{ or } -2 \leq y \leq 0$$

c) yes



24) If $f(x) = 4x - 6$, what is the value of $f(\frac{7x}{8})$?

A) $6 - 2x$

B) $2x - 6$

C) $2x - 3$

D) $\frac{7}{2}x - 6$

$$f(\frac{7x}{8}) = 4(\frac{7x}{8}) - 6 = \frac{7}{2}x - 6$$

25) If $f(x) = x^2 - 3$, then $f(a - b)$ is equal to

A) $a^2 - 2ab + b^2 - 3$

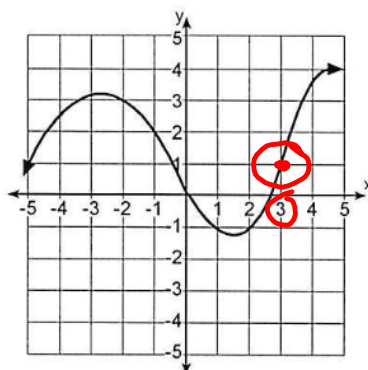
C) $a^2 - 2ab - b^2 - 3$

B) $a^2 + b^2 - 3$

D) $a^2 - b^2 - 3$

26) Given the graph below of $y = f(x)$.

what is
the y-value
when $x = 3$



According to the graph shown, what is the value of $f(3)$?

A) 1

B) 2

C) 3

D) -2

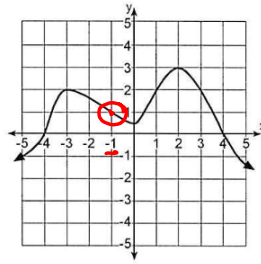
$$25) f(x) = x^2 - 3$$

$$f(a-b) = (a-b)^2 - 3$$

$$f(a-b) = a^2 - 2ab + b^2 - 3$$

$$\begin{aligned} & (a-b)(a-b) \\ & a^2 - ab - ab + b^2 \\ & a^2 - 2ab + b^2 \end{aligned}$$

- 27) The diagram below represents the graph of $y = f(x)$.



What is the value of $f(-1)$ in the graph shown?

- A) 1 B) 2 C) 3 D) -1

- 28) Given the function $f(x) = 3x^2 - 4$, which of the following is true?

- A) $f(0) = 0$ B) $f(-2) = f(2)$ C) $f(5) \cdot f(2) = f(10)$ D) $f(5) + f(2) = f(7)$

- 29) If $f(x) = 3x - 1$ and $g(x) = 4x + 3$, what does $g(f(x))$ equal?

- A) $12x - 1$ B) $12x^2 + 5x - 3$ C) $12x + 8$ D) $12x^2 + 13x - 3$

- 30) If $f(x) = 2x + 1$ and $g(x) = \frac{1}{2}(x - 1)$, what does $f(g(-4))$ equal?

- A) -4 B) 4 C) 1 D) $-\frac{1}{4}$

- 31) If $f(x) = \frac{2}{x+3}$ and $g(x) = \frac{1}{x}$, then $(g \circ f)(x)$ is equal to

- A) $\frac{2x}{1+3x}$ B) $\frac{x+3}{2x}$ C) $\frac{x+3}{2}$ D) $\frac{1+3x}{2x}$

- 32) If $f(x) = 5x^2$ and $g(x) = \sqrt{2x}$, what is the value of $(f \circ g)(8)$?

- A) 1,280 B) 8,10 C) 16 D) 80

- 33) If $g(x) = x + 3$ and $f(x) = x^2 - 2$, find the value of $f(g(x-3))$.

- 34) Given $f(x) = x - 2$ and $g(x) = 5x + 3$, find the value of the following:

$(f \circ g)(x)$

$$32) g(8) = \sqrt{2(8)} = \sqrt{16} = 4$$

$$f(4) = 5(4)^2 = 5(16) = 80 \quad \text{D}$$

$$33) g(x-3) = (x-3) + 3 = x$$

$$f(x) = x^2 - 2$$

$$f(g(x-3)) = x^2 - 2$$

$$34) f(x) = x - 2 \quad g(x) = 5x + 3$$

$$(f \circ g)(x) = (5x + 3) - 2$$

$$= 5x + 1$$

$$29) f(x) = 3x - 1 \quad g(x) = 4x + 3$$

$$g(f(x))$$

$$g(f(x)) = 4(3x - 1) + 3$$

$$\textcircled{A} = 12x - 4 + 3$$

$$= 12x - 1$$

$$30) f(x) = 2x + 1 \quad g(x) = \frac{1}{2}(x - 1)$$

$$f(g(-4))$$

$$g(-4) = \frac{1}{2}(-4 - 1) = \frac{1}{2}(-5) = -\frac{5}{2}$$

$$f\left(-\frac{5}{2}\right) = 2\left(-\frac{5}{2}\right) + 1 = -5 + 1 = -4$$

$$31) f(x) = \frac{2}{x+3} \quad g(x) = \frac{1}{x}$$

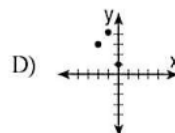
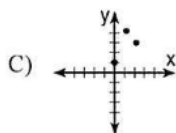
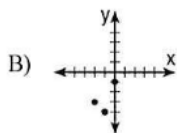
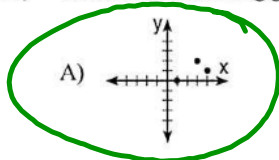
$$(g \circ f)(x) = \frac{1}{\frac{2}{x+3}} = 1 \cdot \frac{x+3}{2} = \frac{x+3}{2}$$

\textcircled{C}

$$A^{-1} = \{(2,1), (3,2), (4,3), (5,4)\}$$

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- 35) Set $A = \{(1,2), (2,3), (3,4), (4,5)\}$. If the inverse of the set A is A^{-1} , which statement is true?
 A) A and A^{-1} are not functions. C) A is a function and A^{-1} is not a function.
 B) A and A^{-1} are functions. D) A is not a function and A^{-1} is a function.
- 36) If $(-3,1)$ is in the function $p(x)$, which of the following points will be in the function $p^{-1}(x)$?
 A) $(-1,3)$ B) $(3,1)$ C) $(3,-1)$ D) $(1,-3)$
- 37) What is the inverse of the equation $y = 3x - 2$?
 A) $y = 2x - 3$ B) $y = x$ C) $y = \frac{x+2}{3}$ D) $y = 3x + 2$
- 38) The inverse function of $\{(2,6), (-3,4), (7,-5)\}$ is
 A) $\{(2,-6), (-3,-4), (7,5)\}$ C) $\{(-2,6), (3,4), (-7,-5)\}$
 B) $\{(-6,-2), (-4,3), (5,7)\}$ D) $\{(6,2), (4,-3), (-5,7)\}$
- 39) Which of the following graphs is the inverse of $f(x) = \{(0,1), (1,4), (2,3)\}$?



$$f^{-1}(x) = \{(1,0), (4,1), (3,2)\}$$

$$37) y = 3x - 2$$

$$\begin{array}{r} x = 3y^{-1} - 2 \\ +2 \qquad \qquad +2 \\ \hline \frac{x+2}{3} = \frac{3y^{-1}}{3} \end{array}$$

$$y^{-1} = \frac{x+2}{3}$$